

1. (Amended) A method of synthesizing an unstructured nucleic acid, the method comprising steps of:

providing a nucleic acid template strand including a first template sequence element and a second template sequence element that is substantially complementary to the first template sequence element;

providing a collection of nucleotide precursors sufficient to synthesize a nucleic acid strand complementary to at least a portion of the template nucleic acid strand, which portion includes the first and second template sequence elements, the collection including first and second complementary nucleotides, wherein the first and second complementary nucleotides have a reduced ability to form an intramolecular base pair but can form an intermolecular base pair; and

contacting the template and the nucleotides with an RNA polymerase enzyme characterized by an ability to polymerize the nucleotides under conditions and for a time sufficient for incorporation of the nucleotides to synthesize the unstructured nucleic acid so that said first complementary sequence element and said second complementary sequence element of the unstructured nucleic acid do not interact with one another.

2. The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide having a purine analog and at least one nucleotide having a pyrimidine analog such that said purine analog and said pyrimidine analog are not capable of forming a stable hydrogen bonded base pair.

3. (Amended) The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-aminodeoxyadenosine 5'-triphosphate, 2-thiodeoxythymidine 5'-triphosphate, deoxyinosine 5'-triphosphate, deoxypyrrolopyrimidine 5'-triphosphate, 2-thiodeoxycytidine 5'-triphosphate, deoxyguanosine 5'-triphosphate, deoxycytidine 5'-triphosphate, deoxyadenosine 5'-triphosphate, deoxythymidine 5'-triphosphate, and modifications thereof.

4. (Amended) The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-

aminodeoxyadenosine 5'-triphosphate, 2-thiodeoxythymidine 5'-triphosphate, deoxyinosine 5'-triphosphate, deoxypyrrrolopyrimidine 5'-triphosphate, and modifications thereof.

5. (Amended) The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-aminodeoxyadenosine 5'-triphosphate, 2-thiodeoxythymidine 5'-triphosphate, deoxyguanosine 5'-triphosphate, 2-thiodeoxycytidine 5'-triphosphate, and modifications thereof.

6. (Amended) The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-aminodeoxyadenosine 5'-triphosphate, 2-thiodeoxythymidine 5'-triphosphate, deoxyguanosine 5'-triphosphate, deoxycytidine 5'-triphosphate, and modifications thereof.

7. (Amended) The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: deoxyinosine 5'-triphosphate, deoxypyrrrolopyrimidine 5'-triphosphate, deoxyadenosine 5'-triphosphate, deoxythymidine 5'-triphosphate, and modifications thereof.

8. (Amended) The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-thiodeoxycytidine 5'-triphosphate, deoxyguanosine 5'-triphosphate, deoxyadenosine 5'-triphosphate, deoxythymidine 5'-triphosphate, and modifications thereof.

9. (Canceled) The method of claims 1-8, wherein the step of contacting with an enzyme comprises with an enzyme selected from the group consisting of: an RNA polymerase, a DNA polymerase, a reverse transcriptase, a ribozyme, and a self-replicating RNA molecule.

10. (Amended) A method of using an unstructured nucleic acid synthesized by the method of claim 1, comprising the steps of:

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adding the unstructured nucleic acid to a ligase assay, a polymerase extension assay, or a nucleic acid array each containing at least one nucleic acid template, and allowing the unstructured nucleic acid to hybridize to the nucleic acid.

Add the following new claims.

19. The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-aminoadenosine ribonucleotide 5'-triphosphate, 2-thiothymidine ribonucleotide 5'-triphosphate, inosine 5'-triphosphate, pyrrolopyrimidine ribonucleotide 5'-triphosphate, 2-thiocytidine ribonucleotide 5'-triphosphate, guanosine ribonucleotide 5'-triphosphate, cytidine ribonucleotide 5'-triphosphate, adenosine ribonucleotide 5'-triphosphate, deoxythymidine 5'-triphosphate, and modifications thereof.

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20. The method of claim 1, wherein the step of providing nucleotides comprises the step of providing a at least one nucleotide selected from the group consisting of: 2-aminoadenosine ribonucleotide 5'-triphosphate, 2-thiothymidine ribonucleotide 5'-triphosphate, inosine 5'-triphosphate, pyrrolopyrimidine ribonucleotide 5'-triphosphate, and modifications thereof.

21. The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-aminoadenosine ribonucleotide 5'-triphosphate, 2-thiothymidine ribonucleotide 5'-triphosphate, guanosine ribonucleotide 5'-triphosphate, 2-thiocytidine ribonucleotide 5'-triphosphate, and modification thereof.

22. The method of claim 1, wherein the step of providing nucleotides comprises the step of providing at least one nucleotide selected from the group consisting of: 2-aminoadenosine ribonucleotide 5'-triphosphate, 2-thiothymidine ribonucleotide 5'-triphosphate, guanosine ribonucleotide 5'-triphosphate, cytidine ribonucleotide 5'-triphosphate, and modifications thereof.